

WHAT IS CLAIMED IS:

1. A game machine comprising:

a controller of a target, the target including at least
5 four known points defining a plane;

an image sensor having an image plane on which
an image of the known points of the target are formed;
a processor that calculates an attitude of the image
plane relative to the plane defined by the known points
of the target on the basis of the output of the image
sensor including the information of the positions of
the image of the known points on the image plane; and
a signal generator that generates a signal to be
transmitted to the controller to cause a change in the
15 target depending on the attitude calculated by the
processor.

2. The game machine according to claim 1, wherein the
target includes a real object, wherein the controller
20 causes a movement of the real object depending on the
attitude calculated by the processor in response to
the signal from the signal generator.

3. The game machine according to claim 1, wherein the
25 controller includes an image display that displays an
image of the target on a display plane, the display
plane corresponding to the plane defined by the known
points.

30 4. The game machine according to claim 3, wherein the
image display includes an image projector for
projecting an image on a screen, the screen
corresponding to the display plane.

35 5. The game machine according to claim 3, wherein the
controller causes the change in the image on the

display plane.

6. The game machine according to claim 5, wherein the controller causes a movement of the image on the display plane depending on the attitude calculated by the processor in response to the signal from the signal generator.

7. The game machine according to claim 5, further comprising a range finder that measures the distance from the image sensor to the display plane, wherein the controller causes the change in the image on the display further depending on the range finder.

8. The game machine according to claim 1, wherein the controller causes a movement of the target depending on the attitude calculated by the processor in response to the signal from the signal generator.

9. The game machine according to claim 1, wherein the processor further calculates the position of a point on the display plane, the image of which is formed at a predetermined position on the image plane, on the basis of the attitude and the output of the image sensor including the information of the positions of the known points, and wherein the signal generator generates the signal further depending on the position calculated by the processor.

10. The game machine according to claim 1, wherein the processor includes a first processor for calculating a first data on the basis of the positions of the image of the known points on the image plane, and a second processor for calculating a second data on the basis of the first data and the positions of the image of the known points on the image plane, the attitude being given on the basis of the second data.

an image display for displaying an image of a target
with at least four known points on a display plane;

a processor for calculating an attitude of the image plane relative to the display plane on the basis of the output of the image sensor including the information of the positions of the image of the known points on the image plane; and

12. The game machine according to claim 11, further comprising a range finder that measures the distance from the image plane to the display plane, wherein the signal generator generates the signal further depending on the distance measured by the range finder.

14. The game machine according to claim 11, wherein
35 the processor includes a first processor for
calculating a first data on the basis of the positions
of the image of the known points on the image plane,

and a second processor for calculating a second data on the basis of the first data and the positions of the image of the known points on the image plane, the attitude being given on the basis of the second data.

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15. A game machine comprising:

an image display for displaying an image of a target point on a display plane with at least four known points;

10 an image sensor having an image plane on which an image of the display plane is formed with the known points included in the image;

15 a processor for calculating the position of a point on the display plane, the image of which is formed at a predetermined position on the image plane, on the basis of the output of the image sensor including the information of the positions of the known points;

20 a comparator for comparing the position of the target point with the position calculated by the processor; and

a signal generator for generating a signal to be transmitted to the image display to cause a change in the image of the target point on the display plane in response to the comparator.

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16. The game machine according to claim 15, wherein the signal generator transmits the signal to cause the change in the image when the comparator finds that the distance from the position calculated by the processor to the position of the target point is less than a limit.

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17. The game machine according to claim 16, further comprising a sighting device for the image of the target point on the display plane, wherein the image of the target point is formed at the predetermined position on the image plain if the image of the target

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18. The game machine according to claim 17, wherein the sighting device includes a monitor of field of view given by the image sensor with an indicia positioned at a position in the field of view corresponding to the predetermined position on the image plane.

15 20. The game machine according to claim 15, wherein
the processor includes a first processor for
calculating a first data on the basis of the positions
of the image of the known points on the image plane,
and a second processor for calculating a second data
20 on the basis of the first data and the positions of
the image of the known points on the image plane, the
position of the point on the display plane being given
on the basis of the second data.

an image sensor having an image plane on which
30 an image of the known points are formed;
a processor for calculating an attitude of the image
plane relative to the display plane on the basis of
the output of the image sensor including the
information of the positions of the image of the known
35 points on the image plane; and
a signal generator for generating a signal to be
transmitted to the image display to cause a change in

the image of the virtual reality space on the display plane depending on the attitude calculated by the processor.

5 22. The game machine according to claim 21, further comprising a range finder that measures the distance from the image plane to the display plane, wherein the signal generator generates the signal further depending on the distance measured by the range
10 finder.

23. The game machine according to claim 22, wherein the processor further calculates the position of a point on the display plane, the image of which is
15 formed at a predetermined position on the image plane, on the basis of the attitude and the output of the image sensor including the information of the positions of the known points, and wherein the signal generator generates the signal further depending on the position
20 calculated by the processor.

24. The game machine according to claim 21, wherein the processor includes a first processor for calculating a first data on the basis of the positions
25 of the image of the known points on the image plane, and a second processor for calculating a second data on the basis of the first data and the positions of the image of the known points on the image plane, the attitude being given on the basis of the second data.
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25. A method of performing a game with a controller of a target, the target including at least four known points defining a plane and an image sensor having an image plane on which an image of the known points of
35 the target are formed, the method comprising the steps of:
calculating an attitude of the image plane relative

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to the plane defined by the known points of the target on the basis of the output of the image sensor including the information of the positions of the image of the known points on the image plane; and
5 generating a signal to be transmitted to the controller to cause a change in the target depending on the attitude calculated by the processor.

26. A computer-readable medium having
10 computer-executable instructions for performing the steps recited in claim 25.

27. A method of performing a game with a an image display for displaying an image of a target with at
15 least four known points on a display plane and an image sensor having an image plane on which an image of the known points are formed, the method comprising the steps of:
calculating an attitude of the image plane relative
20 to the display plane on the basis of the output of the image sensor including the information of the positions of the image of the known points on the image plane; and
generating a signal to be transmitted to the image
25 display to cause a change in the image of the target on the display plane depending on the attitude calculated by the processor.

28. A computer-readable medium having
30 computer-executable instructions for performing the steps recited in claim 27.

29. A method of performing a game with a an image display for displaying an image of a target point on
35 a display plane with at least four known points and an image sensor having an image plane on which an image of the display plane is formed with the known points

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calculating the position of a point on the display plane, the image of which is formed at a predetermined position on the image plane, on the basis of the output of the image sensor including the information of the positions of the known points;

generating a signal to be transmitted to the image display to cause a change in the image of the target point on the display plane in response to the comparator.

30. A computer-readable medium having computer-executable instructions for performing the steps recited in claim 29.

31. A method of performing a game with an image display for displaying an image of a virtual reality space with at least four known points on a display plane and

an image sensor having an image plane on which an image of the known points are formed, the method comprising the steps of:

calculating an attitude of the image plane relative to the display plane on the basis of the output of the image sensor including the information of the positions of the image of the known points on the image plane; and

generating a signal to be transmitted to the image display to cause a change in the image of the virtual reality space on the display plane depending on the attitude calculated by the processor.

32. A computer-readable medium having computer-executable instructions for performing the steps recited in claim 31.